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Jellá

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(54) **TRIM BOARD ASSEMBLY AND DOOR SECTION FOR CARRIAGE HOUSE REPLICA GARAGE DOOR**

(75) Inventor: **John F. Jellá**, Tempe, AZ (US)

(73) Assignee: **First United Door Technologies, LLC**, Tempe, AZ (US)

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(51) **Int. Cl.**
E06B 3/12 (2006.01)

(52) **U.S. Cl.** **160/236**; 428/76; 52/717.01

(58) **Field of Classification Search** 160/201, 160/236; 52/716.6, 716.8, 717.01, 718.02, 52/718.01, 718.04, 718.06, 718.03, 716.5, 52/716.1, 717.06, 309.9, 784.1, 784.13, 784.15; 428/621, 76
See application file for complete search history.

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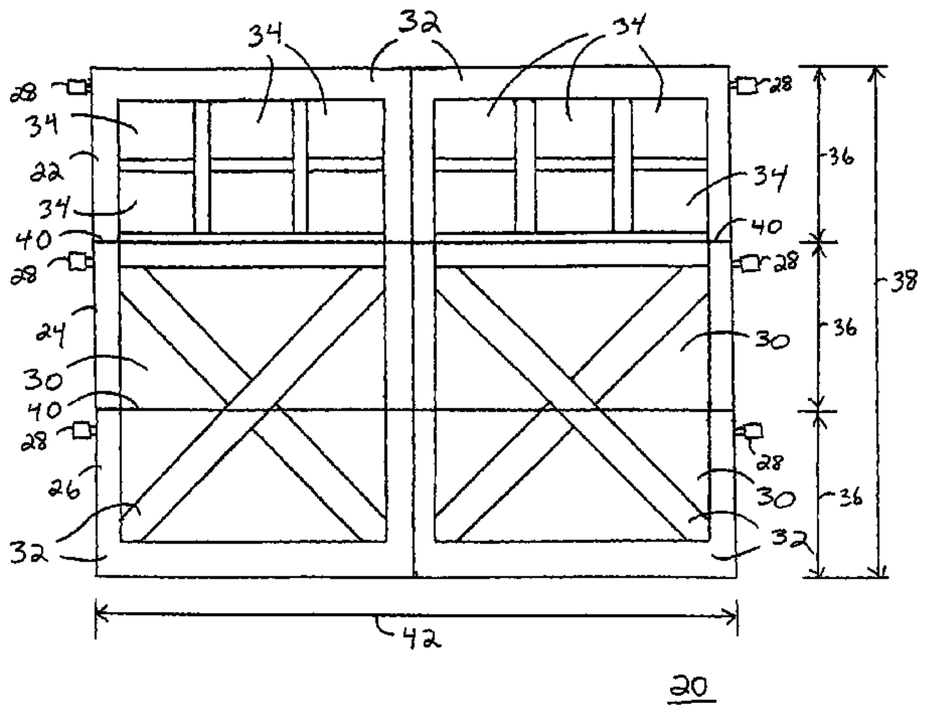
Primary Examiner—Blair M. Johnson
(74) *Attorney, Agent, or Firm*—Michael A. Mann; Nexsen Pruet, LLC

(57) **ABSTRACT**

A carriage house replica garage door (**20**) is formed from first, second, and third door sections (**22**, **24**, **26**). Each of the door sections (**22**, **24**, **26**) includes a sheet metal layer (**30**). A trim board assembly (**232**) includes a backing (**234**) configured for attachment to the sheet metal layer (**30**) and a channel section (**236**) installed over the backing (**234**). Brace means in the form of insulating foam board (**238**) is juxtaposed between the backing (**234**) and the channel section (**236**). The insulating foam board (**238**) is adhered between the backing (**34**) and the channel section (**236**) so that physical contact is inhibited between the backing (**234**) and the channel section (**236**) at an attachment location.

18 Claims, 9 Drawing Sheets



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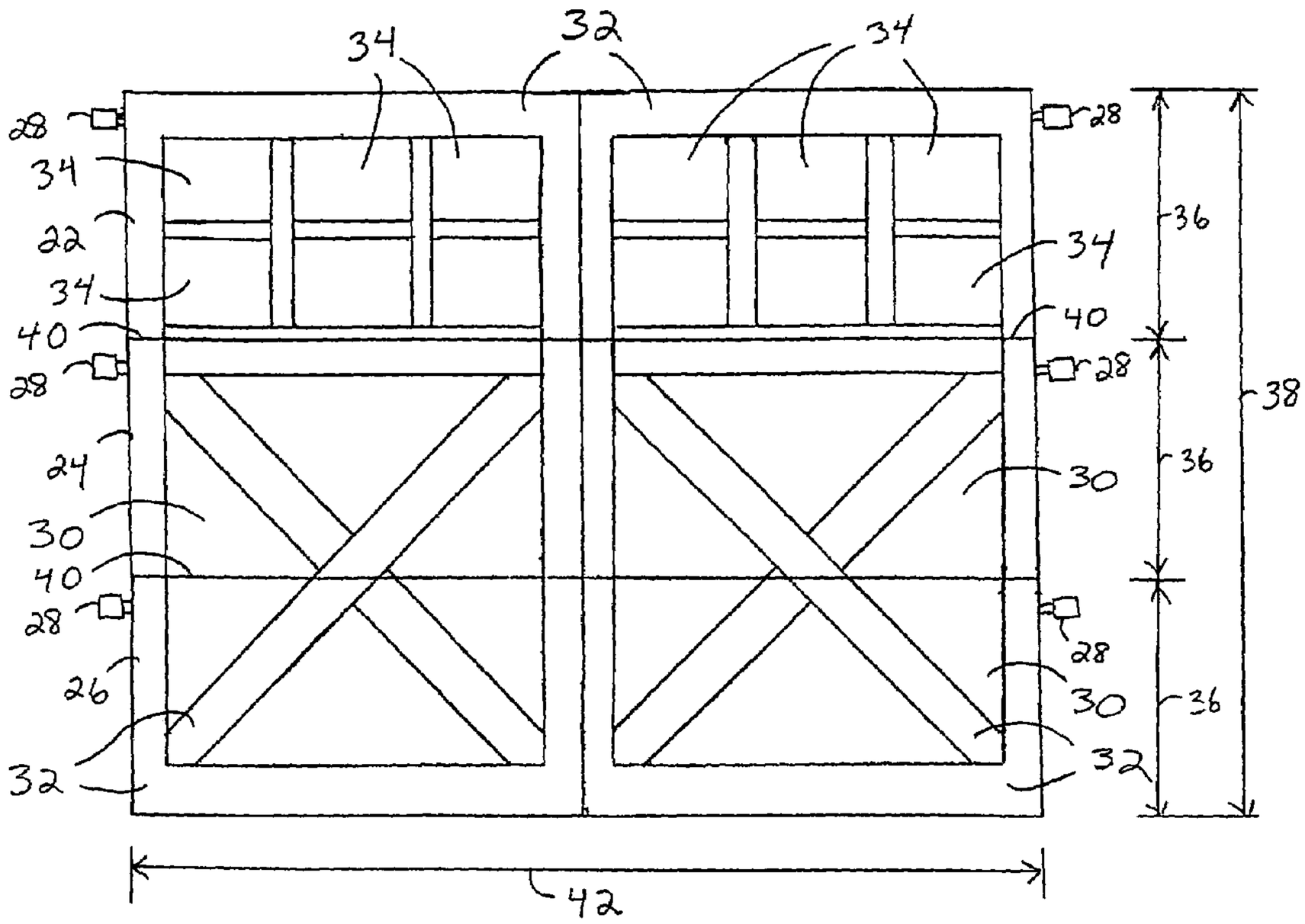
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FIG. 1

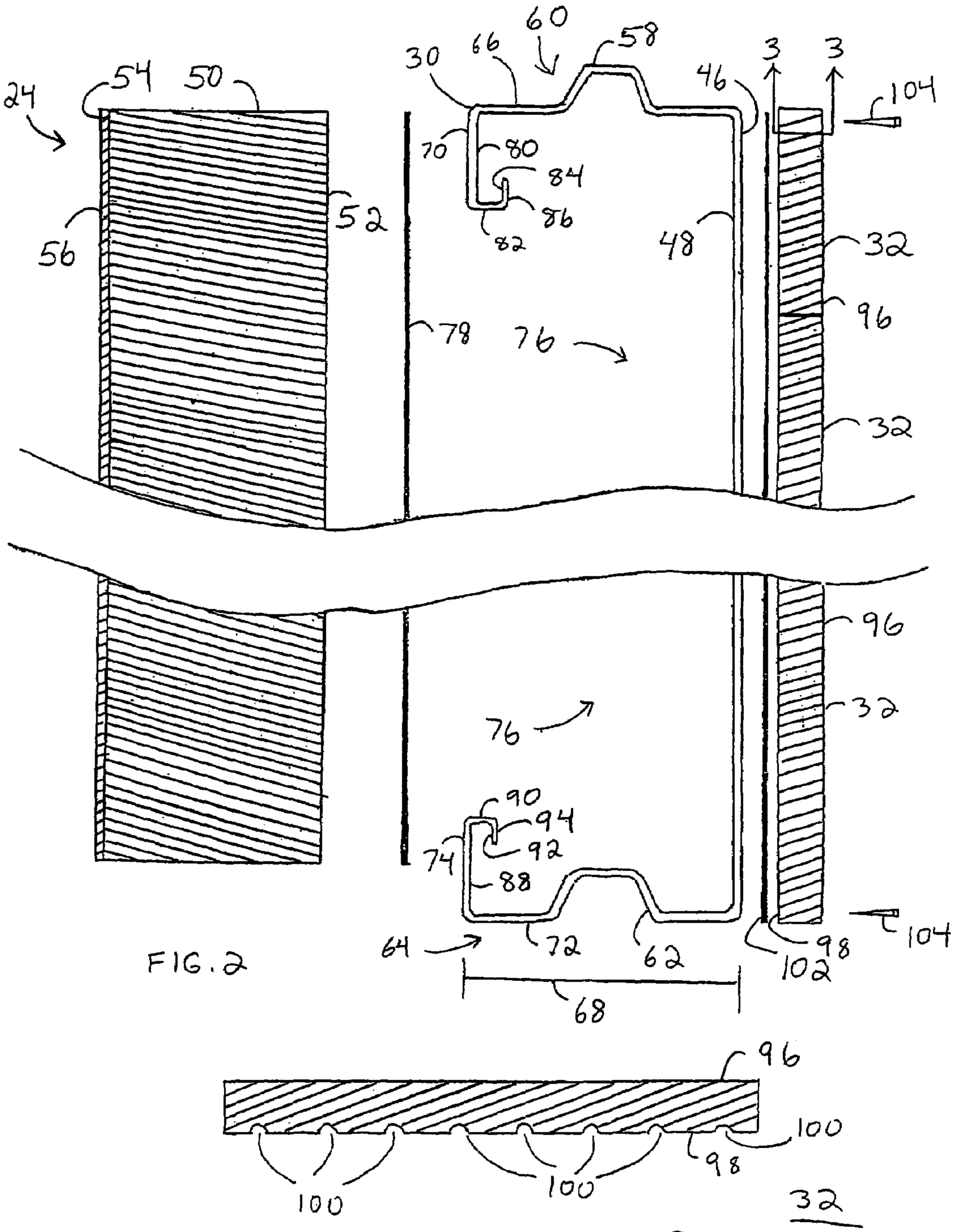
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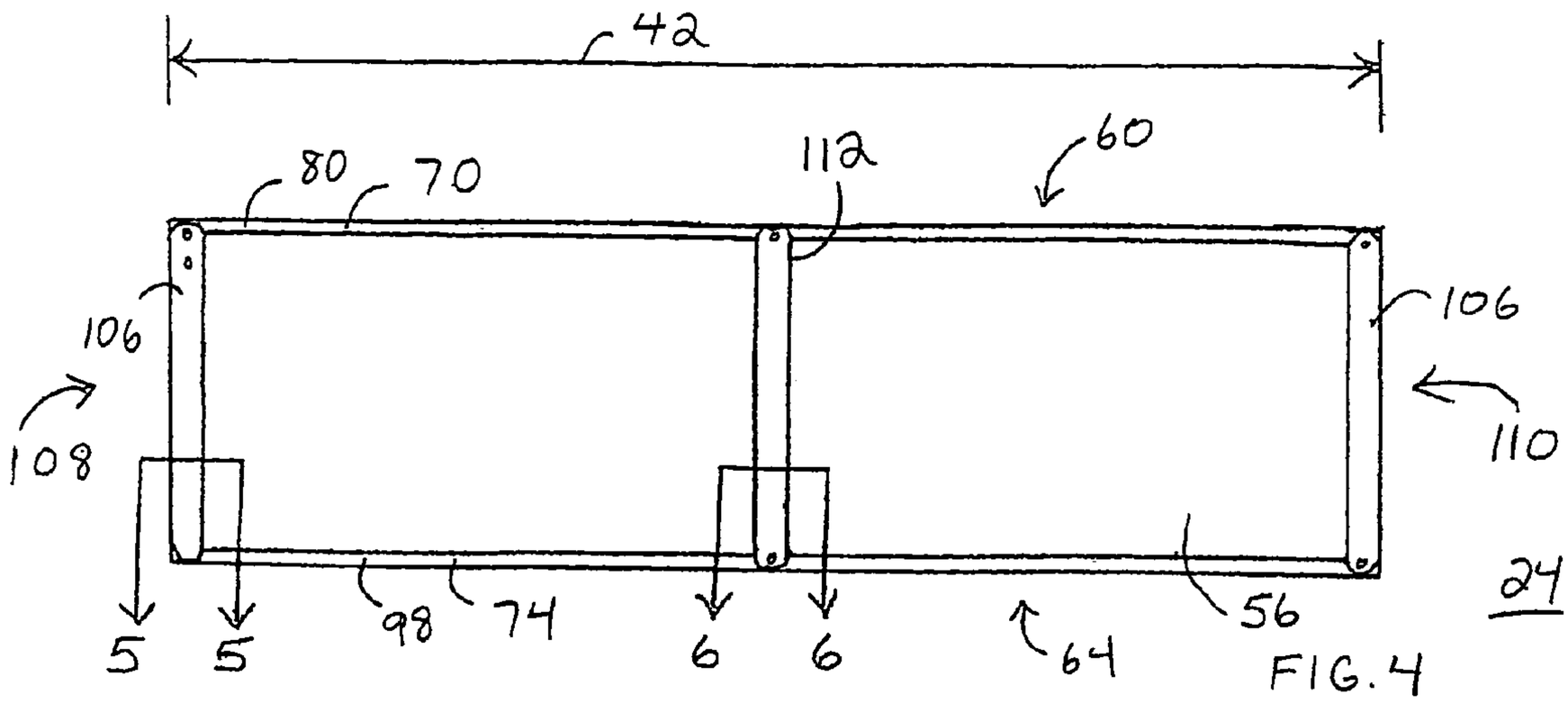
FIG. 2

FIG. 3



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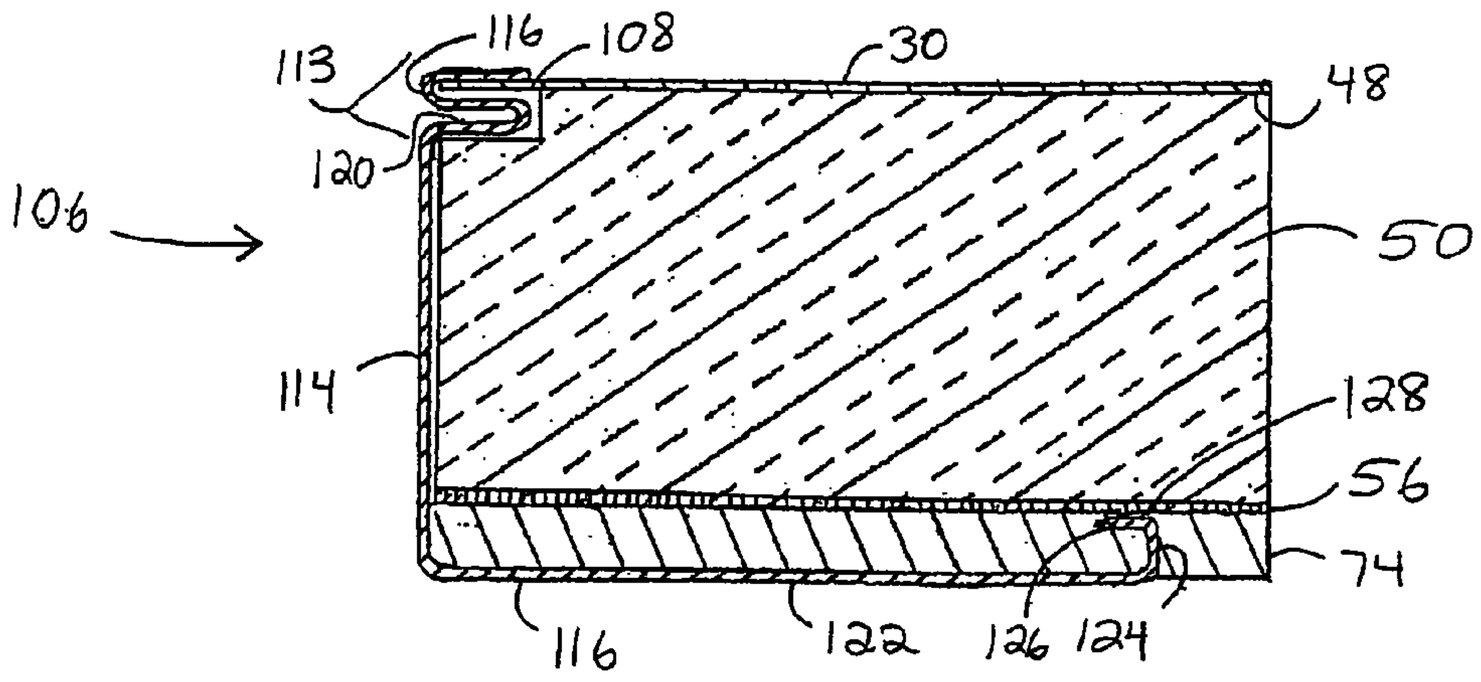

FIG. 5

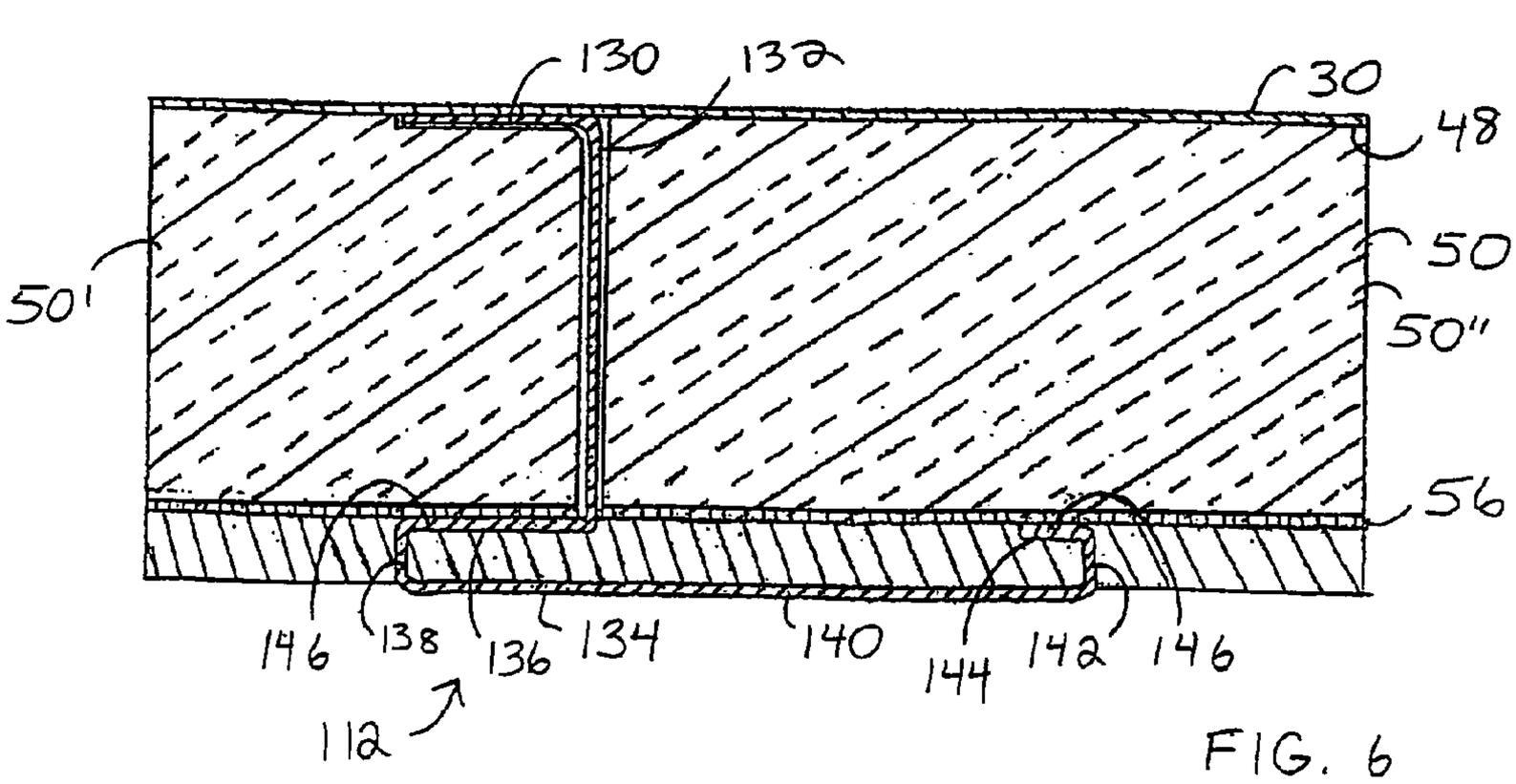

FIG. 6

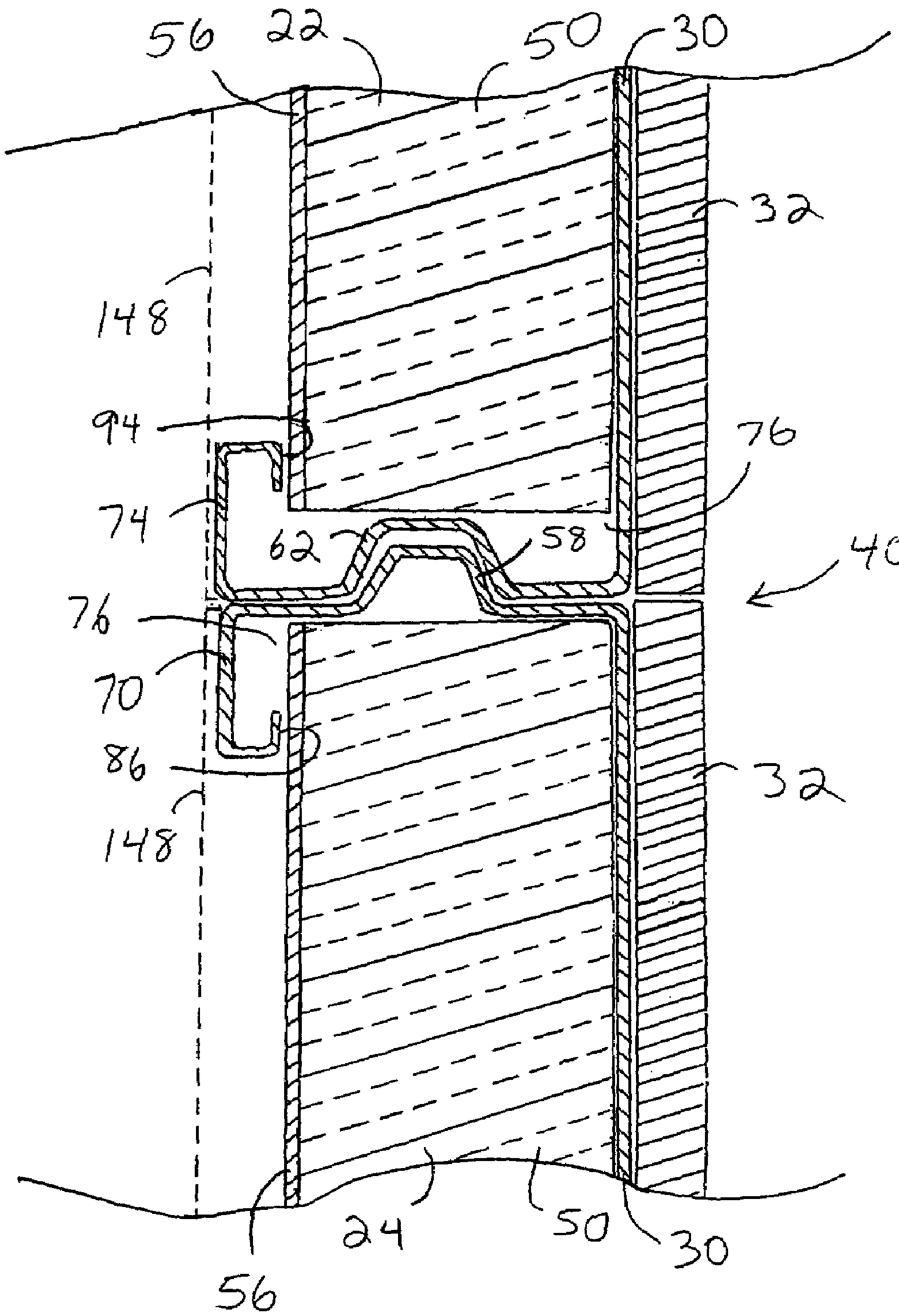

FIG. 7

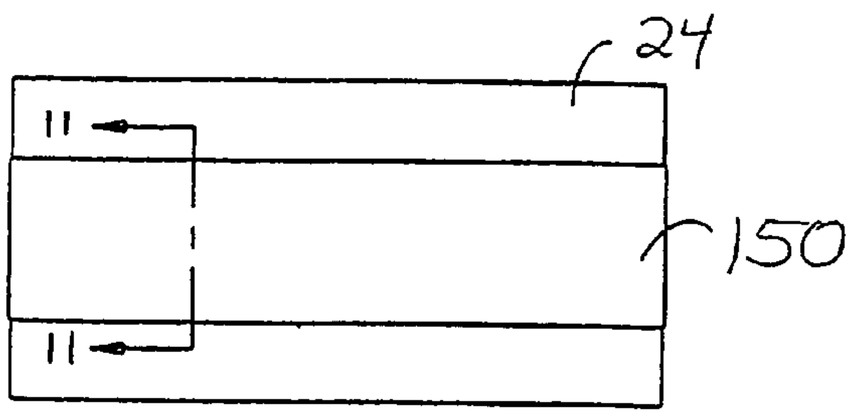

FIG. 8

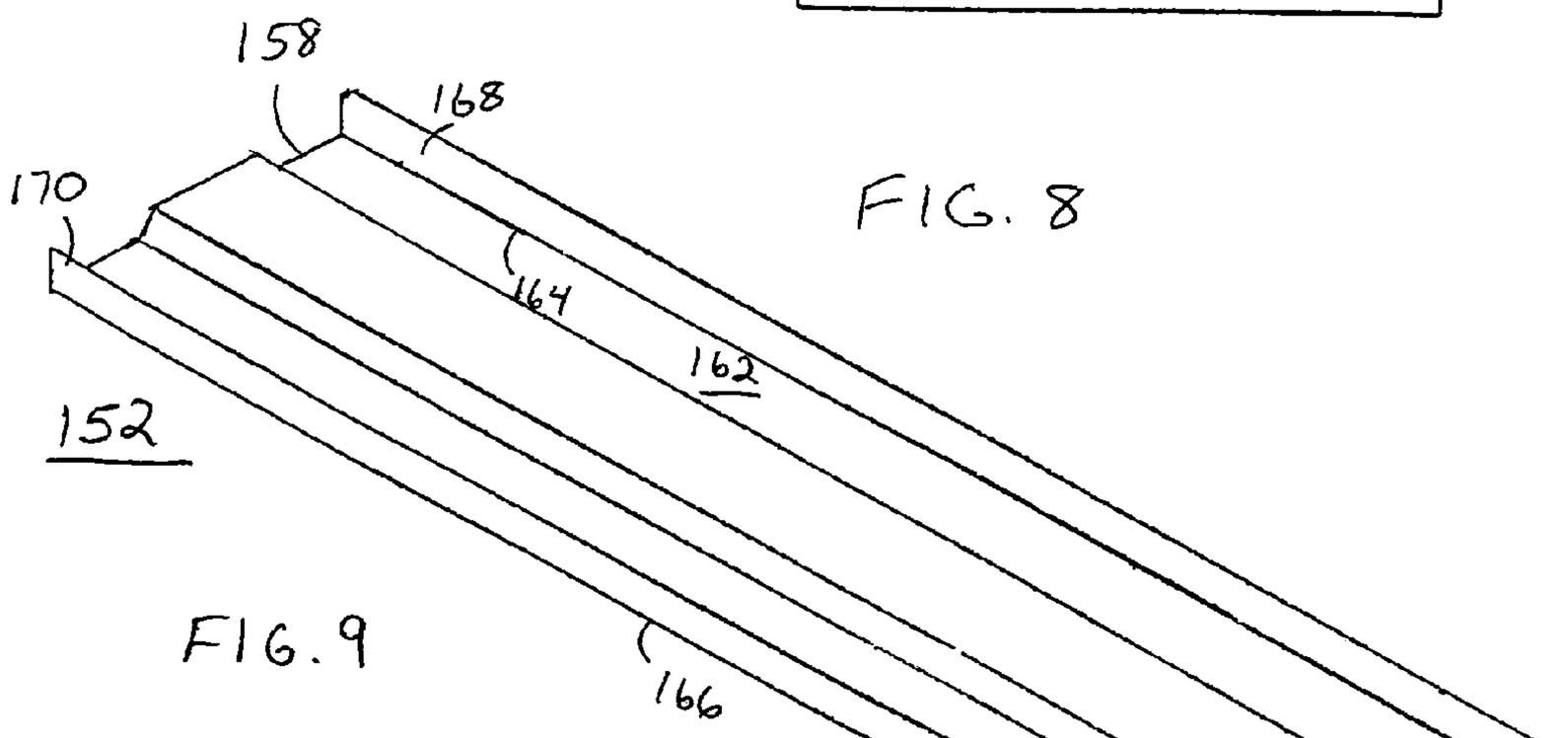

FIG. 9

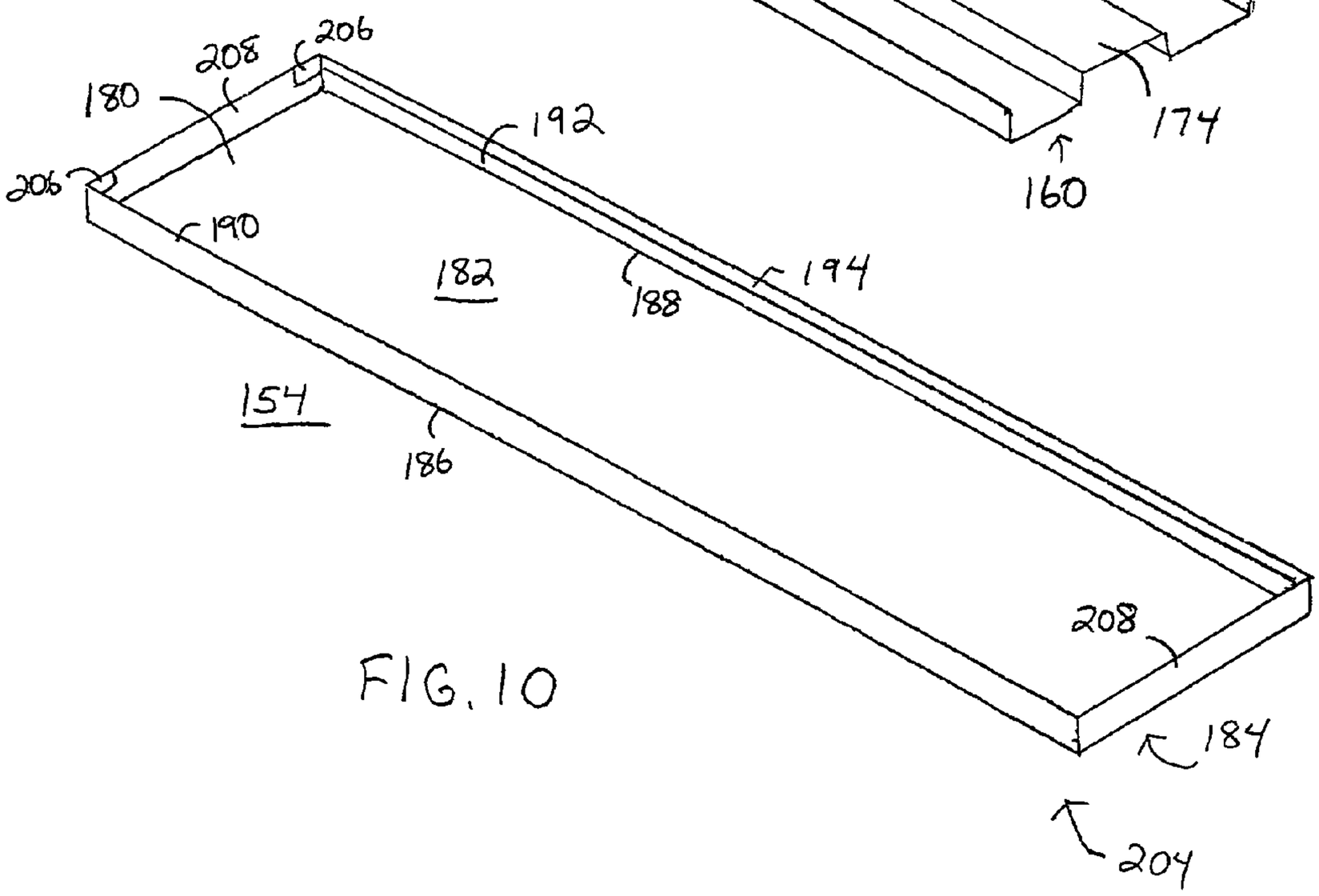

FIG. 10

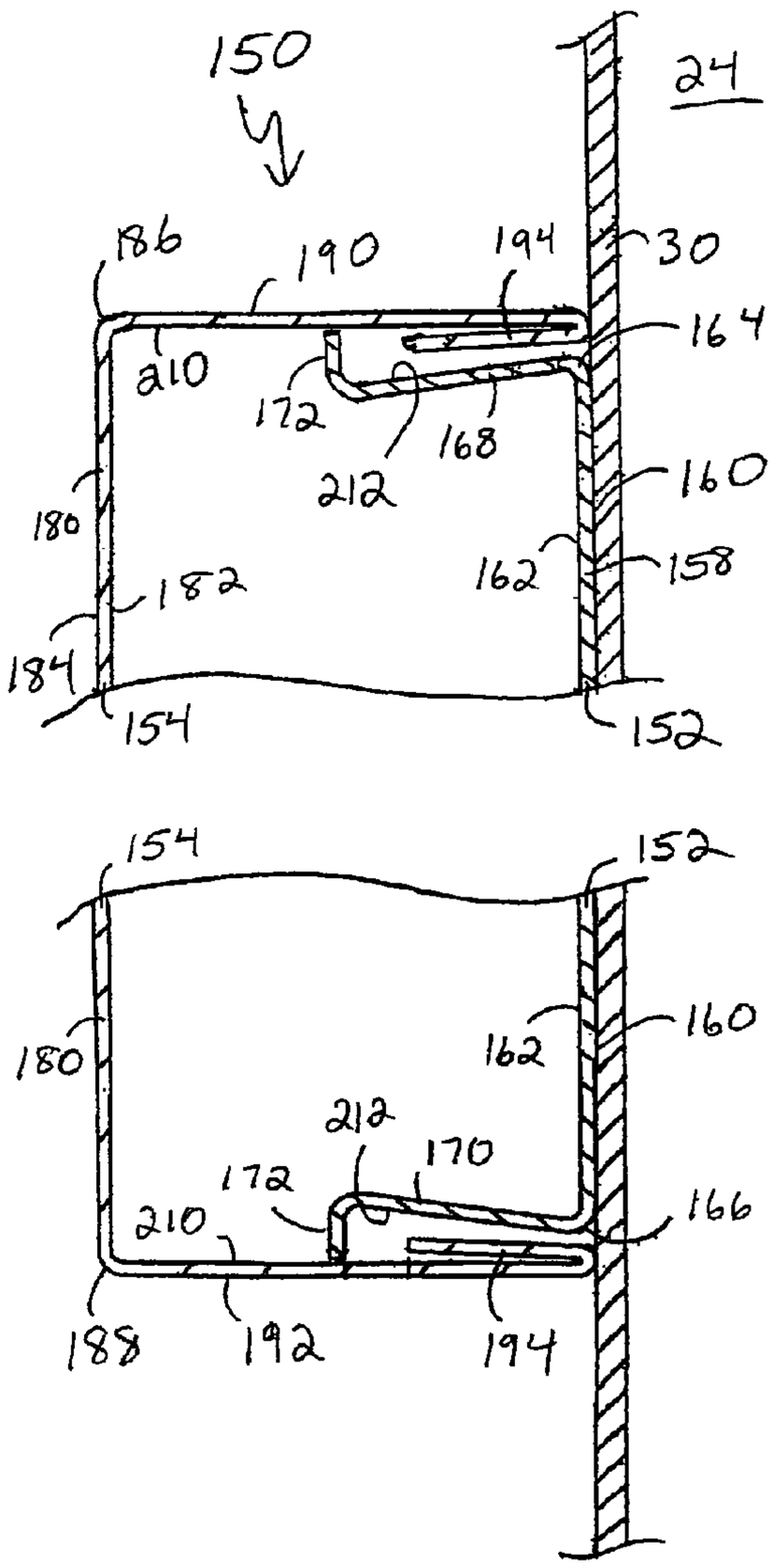
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FIG. 11

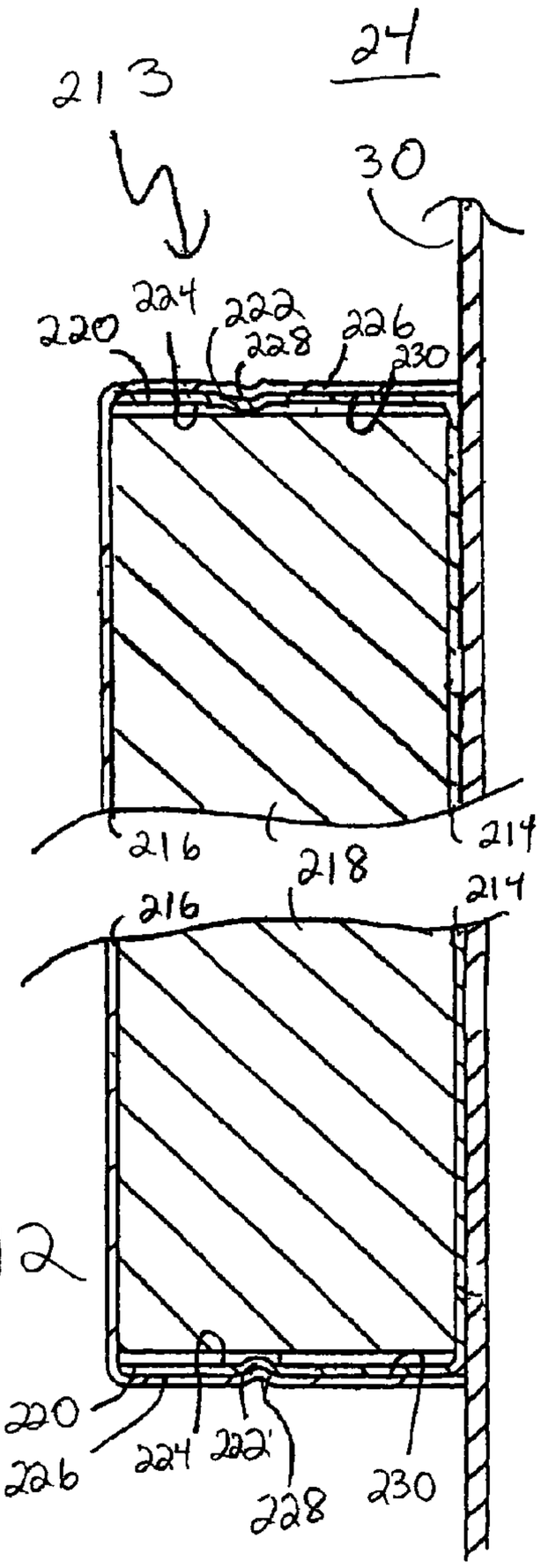
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FIG. 12

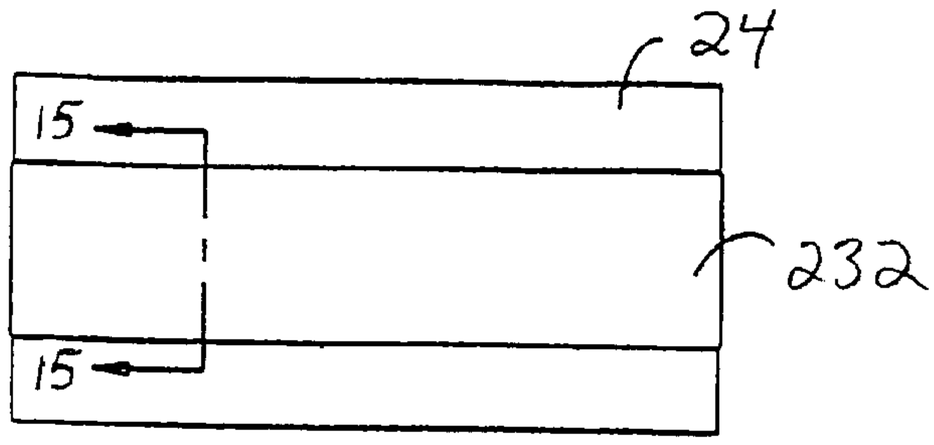
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FIG. 13

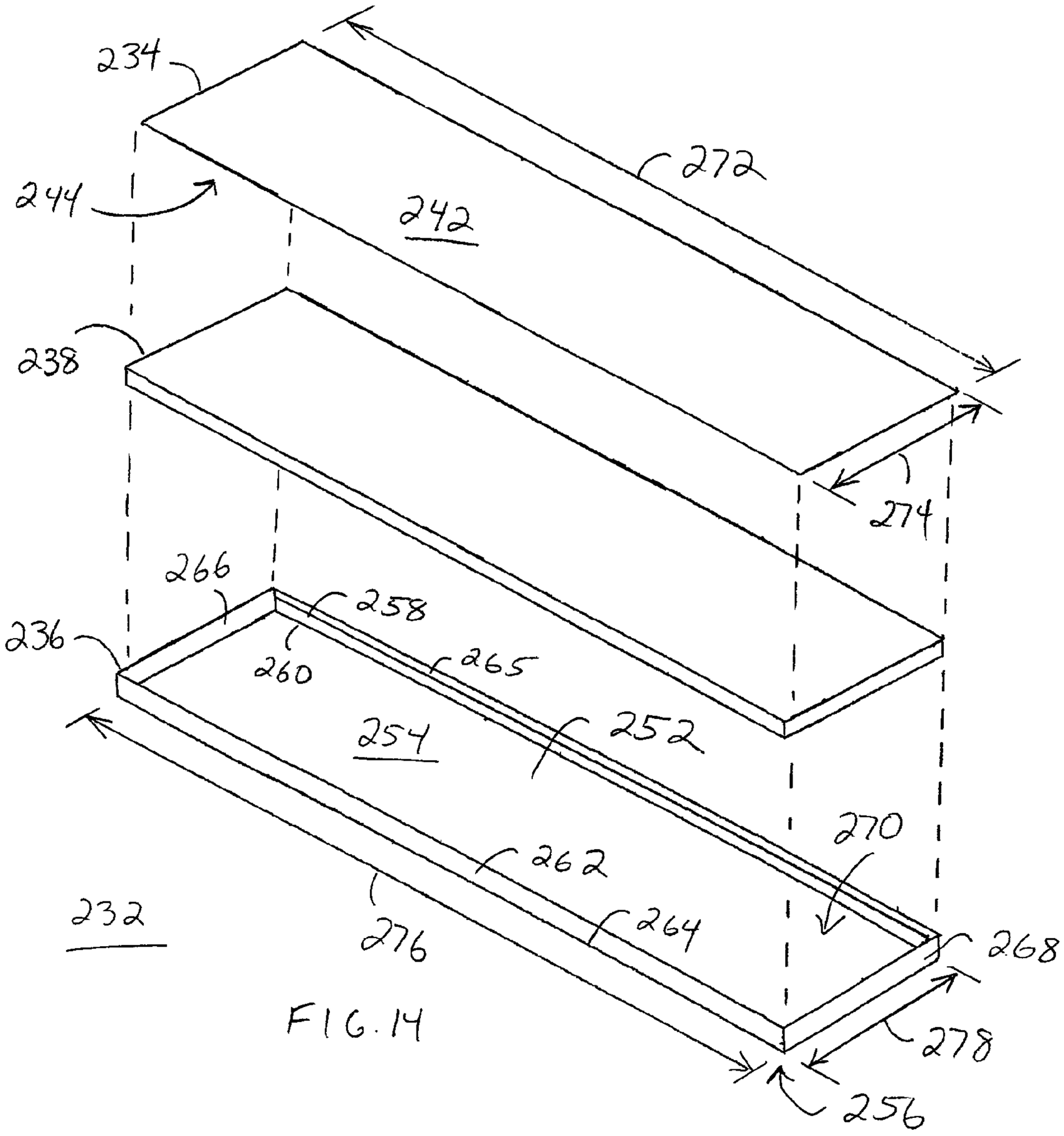
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FIG. 14

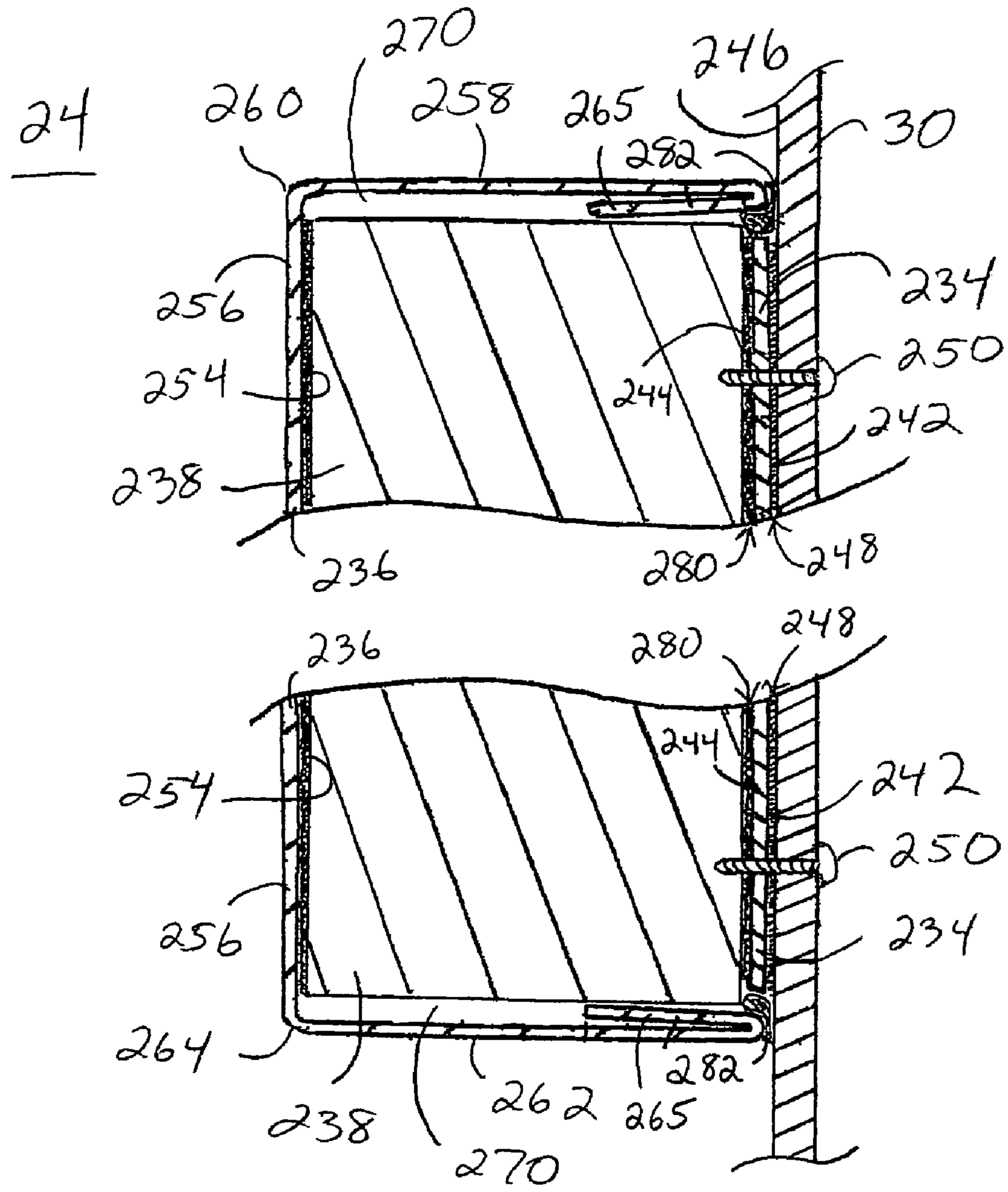
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FIG. 15

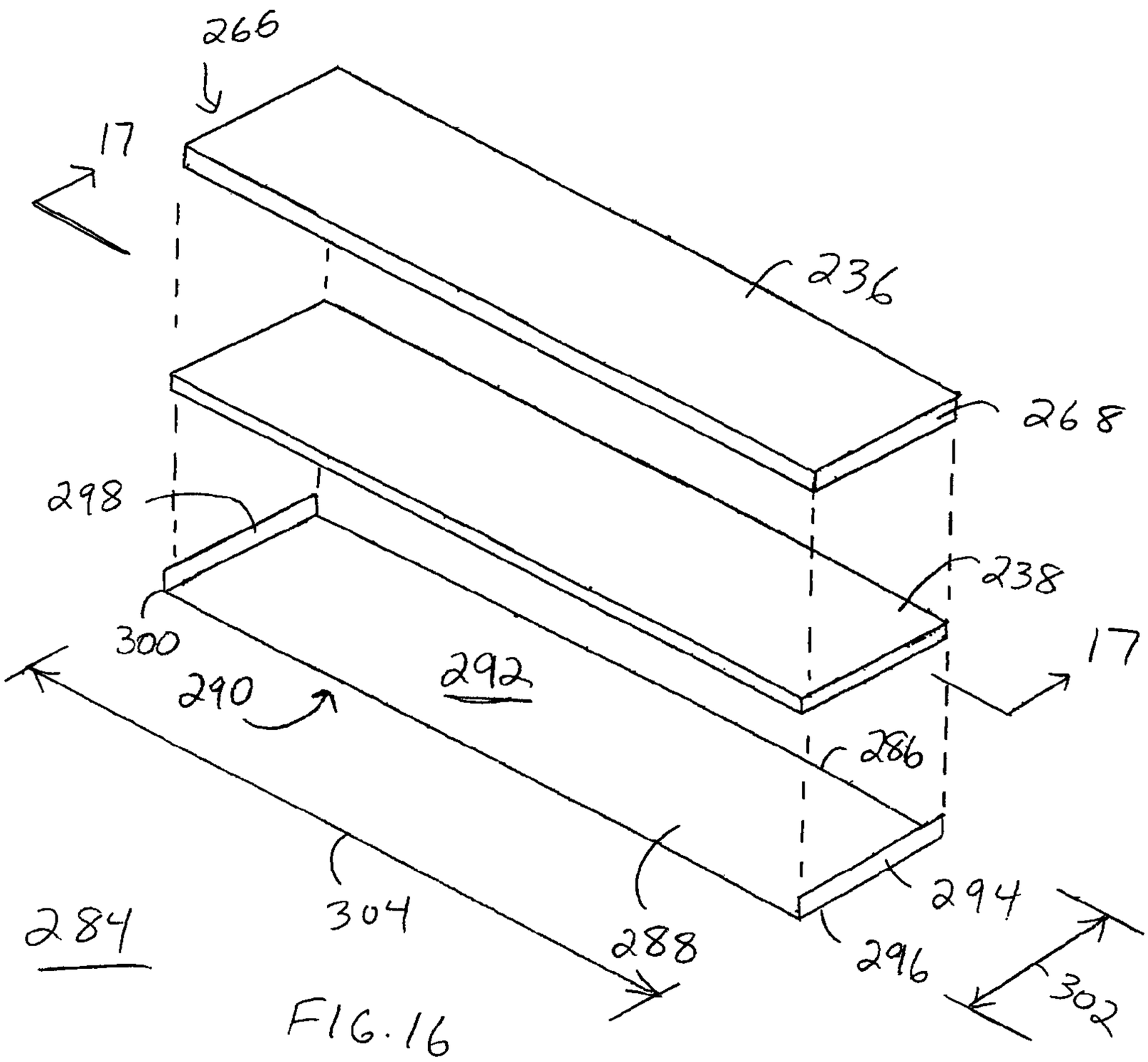
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FIG. 16

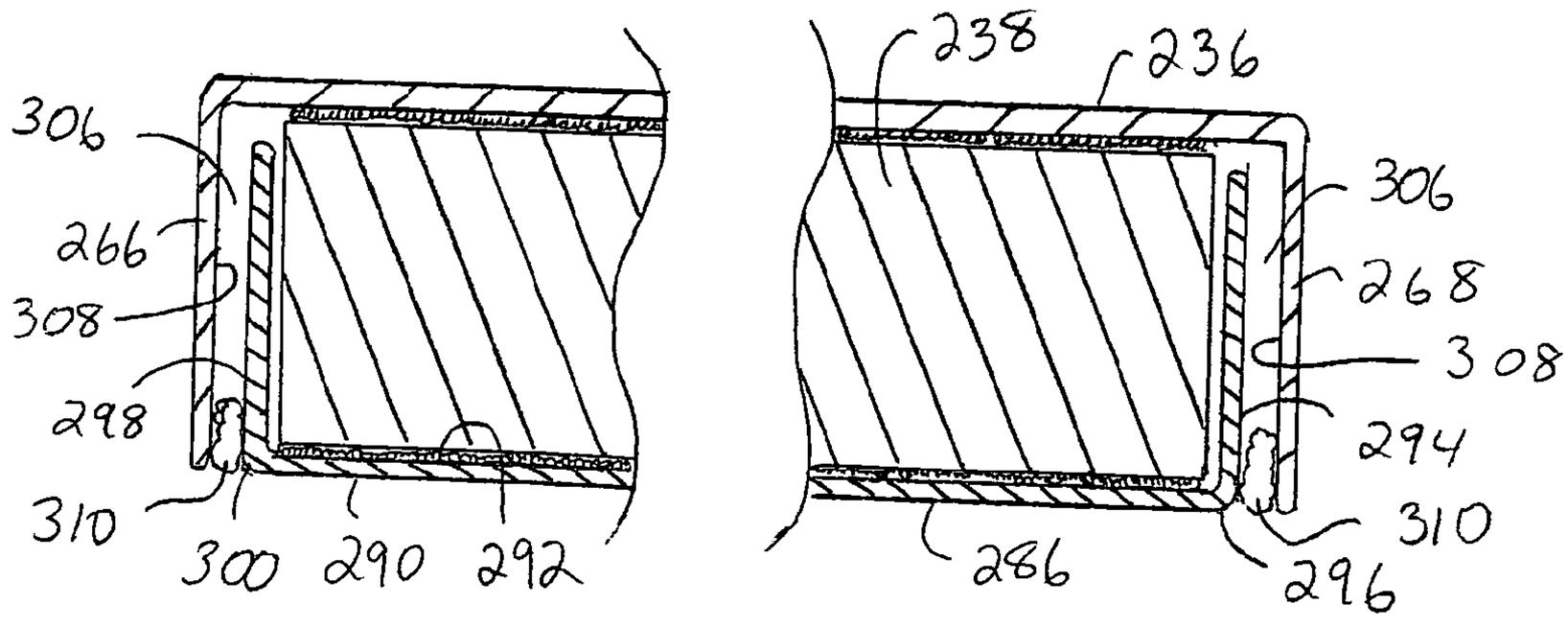
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FIG. 17

TRIM BOARD ASSEMBLY AND DOOR SECTION FOR CARRIAGE HOUSE REPLICA GARAGE DOOR

RELATED INVENTION

The present invention is a continuation-in-part (CIP) of "TRIM BOARD SYSTEM AND DOOR SECTION FOR CARRIAGE HOUSE REPLICA GARAGE DOOR," U.S. patent application Ser. No. 10/413,989, filed 14 Apr. 2003, now abandoned, which is a continuation-in-part (CIP) of "DOOR SECTION FOR CARRIAGE HOUSE REPLICA GARAGE DOOR," U.S. patent application Ser. No. 09/792,543, filed 22 Feb. 2001, abandoned, both of which are incorporated by reference herein.

TECHNICAL FIELD OF THE INVENTION

The present invention relates to the field of garage doors. More specifically, the present invention relates to garage doors that replicate wood sectional carriage house garage doors.

BACKGROUND OF THE INVENTION

A typical overhead garage door is constructed from a plurality of door sections, which are hinged together and supported from a track system with rollers attached to opposite ends of the door sections. The rollers generally allow the door to be moved from a vertically oriented closed position to a substantially horizontal open position. Electrically powered garage door openers are often used with the overhead garage door so that a driver may conveniently open and close the door from within a vehicle.

With regard to residential applications, an overhead garage door is generally either eight or sixteen feet wide. Typically, such a door includes four horizontally oriented door sections, each of which is about eight or sixteen feet wide and twenty-one inches high. For example, a single car residential garage may have an eight foot wide by seven foot high door. Likewise, a two car residential garage may have a single sixteen foot wide door by seven foot high door or two eight foot wide by seven foot high doors.

Some of the first doors made for garages were one piece barn doors that operated as large swinging or sliding doors. The nostalgic design of these doors is replicated in wood sectional carriage house garage doors. Indeed, wood sectional carriage house garage doors are particularly desirable for use with older homes to maintain the historic design of the home while gaining the convenience of the conventional overhead garage door. Carriage house garage doors are also desirable with newer homes for enhancing the overall appearance of the garage and consequently the house.

A sectional carriage house door functions like a typical overhead garage door in that it moves on a track and roller system to open and close the door. However, the appearance of the sectional carriage house door simulates the historic swing type doors used in early automobile shelters. The historic appearance of the sectional carriage house door is created by the application of various types of wood siding, wood trim boards, and/or wood raised panels applied over the exterior side of wood flush door sections, and wood or steel open frame door sections.

Unfortunately, a wood carriage house garage door is very costly relative to a conventional steel overhead garage door. This cost is due in part to labor costs incurred to perform the largely manual process of constructing the wood carriage house door. Furthermore, the material cost for the wood siding, wood trim boards, and/or wood raised panels is undesirably high. Thus, a homeowner may pay five to six times more for a wood carriage house door than for a conventional steel overhead door.

In addition to the costly initial investment, wood carriage house doors are costly to maintain. In particular, the wood is adversely affected by the elements. That is sun, rain, snow, varying temperatures, and so forth will degrade the finish of the wood and eventually cause the wood to warp, split, or rot. Consequently, the wood carriage house garage door should be re-sealed or re-painted every couple of years to maintain the aesthetic appearance and integrity of the wood carriage house garage door. This labor intensive and costly maintenance is highly undesirable to the typical homeowner.

In addition, insects, such as termites and carpenter ants, frequently attack the wood causing significant damage to the wood. Accordingly, the use of a wood carriage house garage door necessitates frequent inspections and treatment for insect damage. Again, this is a highly undesirable situation to the homeowner in terms of labor and cost.

Another problem with a wood carriage house garage door results from the weight of the wood siding, wood trim board, and/or wood raised panels, which typically adds one hundred to two hundred pounds to the overall weight of the sectional carriage house door. In particular, the wood or steel open frame door sections often lack the structural integrity or the strength to adequately support the added weight of the wood siding. Thus, the wood carriage house door has a limited life.

In addition, the wood carriage house door necessitates the use of reinforced hardware to support the weight of the wood. This leads to higher up front costs incurred by the homeowner for the appropriate hardware. If hardware is used that is insufficient for supporting the door, the door may repeatedly fall out of the door tracks, or the hardware components, such as the rollers, connection points, springs, or the tracks could fail causing property damage and/or injury.

In addition to the excessive cost and mechanical problems associated with a wood sectional carriage house door, the sectional carriage house door suffers from problems associated with aesthetic appearance. In particular, the use of four twenty-one inch horizontally oriented door sections to form the carriage house door results in three horizontal lines created at the section joints. These horizontal lines at the section joints detract from the appearance of the door, which is contrary to the objectives of maintaining the historic design and enhancing the overall appearance of the garage.

Thus, what is needed is an overhead garage door that is affordable, durable, low maintenance, impervious to weather and insects, and replicates the appearance of the historic swing type doors used in early automobile shelters.

SUMMARY OF THE INVENTION

Accordingly, it is an advantage of the present invention that a door section for a carriage house replica garage door is provided.

It is another advantage of the present invention that a door section is provided to form an aesthetically pleasing and cost effective replica of a wood sectional carriage house garage door.

It is another advantage of the present invention that a door section is provided to form a carriage house replica garage door that is relatively lightweight and structurally sound.

Yet another advantage of the present invention is that a trim board assembly is provided for a door section of a carriage house replica garage door that is durable in extreme environmental conditions and requires little maintenance.

The above and other advantages of the present invention are carried out in one form by a trim board assembly for a door section of a carriage house replica garage door. The trim board assembly includes a backing configured for attachment to a face of the door section, a channel section installed over the backing, and means for attaching the channel section to the backing that prevents physical contact between the backing and the channel section at an attachment location.

The above and other advantages of the present invention are carried out in another form by a door section for a carriage house replica garage door. The door section includes a sheet metal layer having an outer face and a trim board assembly. The trim board assembly includes a backing attached to said face of said door section, a channel section installed over the backing, and brace means juxtaposed between the backing and the channel section. Each of the backing and the channel section is formed from sheet metal. The trim board assembly further includes means for attaching the channel section to the backing that prevents physical contact between the backing and the channel section at an attachment location.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention may be derived by referring to the detailed description and claims when considered in connection with the Figures, wherein like reference numbers refer to similar items throughout the Figures, and:

FIG. **1** shows a front view of a carriage house replica garage door in accordance with a preferred embodiment of the present invention;

FIG. **2** shows a partial, exploded side view of a door section of the carriage house replica garage door of FIG. **1**;

FIG. **3** shows a sectional view of a cellular foam trim board along line **3-3** in FIG. **2**;

FIG. **4** shows a rear view of a door section of the carriage house replica garage door;

FIG. **5** shows a sectional view of an end support member along line **5-5** in FIG. **4**;

FIG. **6** shows a sectional view of a center support member along line **6-6** in FIG. **4**;

FIG. **7** shows a partial side view of a section joint between two door sections of the carriage house replica garage door of FIG. **1**;

FIG. **8** shows a front view of a door section of the carriage house replica door of FIG. **1** including a trim board system in accordance with an alternative embodiment of the present invention;

FIG. **9** shows a perspective view of a first channel section of the trim board system of FIG. **8**;

FIG. **10** shows a perspective view of a second channel section of the trim board system of FIG. **8**;

FIG. **11** shows a partial sectional view of the door section along line **11-11** of FIG. **8**;

FIG. **12** shows a partial sectional view of the door section in which a trim board system in accordance with an alternative embodiment of the present invention is employed;

FIG. **13** shows front view of a door section of the carriage house replica door of FIG. **1** including a trim board assembly in accordance with another alternative embodiment of the present invention;

FIG. **14** shows an exploded perspective view of the trim board assembly of FIG. **13**;

FIG. **15** shows a partial sectional view of the door section along line **15-15** of FIG. **13**;

FIG. **16** shows an exploded perspective view of a trim board assembly in accordance with another alternative embodiment of the present invention; and

FIG. **17** shows a partial sectional view of the trim board assembly along line **17-17** of FIG. **16**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** shows a front view of a carriage house replica garage door **20** in accordance with a preferred embodiment of the present invention. Carriage house replica garage door **20** replicates in appearance a conventional wood sectional carriage house garage door, hence the use of the term "replica" in carriage house replica garage door **20**. Carriage house replica garage door **20** is an overhead sectional garage door having first, second, and third door sections **22**, **24**, and **26**, respectively, that are hinged together.

Guide members **28**, attached to opposite ends of each of first, second, and third door sections **22**, **24**, and **26**, allow door **20** to be moved from a vertically oriented closed position to a substantially horizontal open position along a track system (not shown) coupled to a garage (not shown). One exemplary track system including guide members **28** is described in "Door Track", by John F. Jellá, U.S. Pat. No. 5,737,802, issued 14 Apr. 1998, and incorporated by reference herein.

Carriage house replica garage door **20** simulates the appearance of historic swing type doors used in early automobile shelters. However, carriage house replica garage door **20** utilizes materials that are lightweight, resistant to the effects of weather and insects, and low maintenance. For example, carriage house replica garage door **20** includes a sheet metal layer **30** with cellular foam trim boards **32** attached to and arranged in a pattern over sheet metal layer **30**. First door section **22** of door **20** also includes windows **34** to further enhance the aesthetic appearance of door **20**.

The pattern of cellular foam trim boards **32** over sheet metal layer **30**, known as a cross-buck pattern, and the inclusion of windows **34** in carriage house replica garage door **20** represents one configuration of carriage house replica garage door **20**. However, it should be apparent to those skilled in the art, that cellular foam trim boards **32** and/or windows **34** may be arranged differently then what is shown in FIG. **1** to obtain a desired style for carriage house replica garage door **20**. For example, cellular foam trim boards **32** may be arranged in a half-buck pattern, perimeter pattern, vertical pattern, horizontal pattern, and so forth, while windows **34** may be smaller, larger, include curve tops, and so forth.

In a preferred embodiment, carriage house replica garage door **20** is manufactured from three door sections, i.e., first, second, and third door sections **22**, **24**, and **26**, each having a height **36** of substantially twenty-eight inches. Thus, first, second, and third door sections **22**, **24**, and **26** function cooperatively to yield an overall height **38** of substantially eight-four inches, or seven feet.

A total of three door sections advantageously decreases a number section joints from three, created by the four sections of conventional overhead doors, to only two section joints **40** created by the three wood overlay sections **22**, **24**, and **26** of garage door **20**. The two section joints **40** of garage door **20** are less conspicuous than the three section

joints of a wood carriage house garage door or conventional overhead garage door thereby effectively enhancing the appearance of carriage house replica garage door over conventional sectional garage doors.

In the illustrative embodiment of FIG. **1**, each of first, second, and third door sections **22**, **24**, and **26**, respectively, has a width **42** of approximately ninety-six inches, or eight feet. Thus, garage door **20** is sized to fit a conventional single-car residential garage door opening of eight feet wide by seven feet high. Alternatively, garage door **20** may be adapted to fit a two car residential garage having a single sixteen foot wide by seven foot high opening, or another conventional or custom dimensioned garage door opening.

FIG. **2** shows a partial, exploded side view of second door section **24** of carriage house replica garage door **20** (FIG. **1**). The structure of second door section **24** is described for clarity of illustration. However, it should be understood that first and third door sections **22** and **26**, respectively, are fabricated in a similar manner. The differences between first, second, and third door sections **22**, **24**, and **26** are the absence or presence of windows **34** (FIG. **1**) and/or the pattern of cellular foam trim boards **32**. Consequently, the following description of the structure of second door section **24** applies to first and third door sections **22** and **26** as well.

Second door section **24** includes sheet metal layer **30** having an outer surface **46** and an inner surface **48**. Sheet metal layer **30** is rotary embossed with a wood grain pattern to replicate an appearance of wood on outer surface **46**. An insulating foam board **50** has a first side **52** coupled to inner surface **48** of sheet metal layer **30** and a second side **54** having a steel laminate backing **56**. Cellular foam trim boards **32** are coupled to outer surface **46** of sheet metal layer **30**. In a preferred embodiment, sheet metal layer **30** is formed from twenty-four gauge steel. Although twenty-four gauge steel is preferred, it should be apparent to those skilled in the art that other widths of steel may be utilized. Alternatively, other metals, such as aluminum, formed into sheets may be utilized.

Sheet metal layer **30** includes a tongue portion **58** along a first longitudinal edge **60** and a groove portion **62** located along a second longitudinal edge **64** of sheet metal layer **30**. Following, rotary embossment of sheet metal layer **30** with a wood grain pattern, tongue and groove portions **58** and **62**, respectively, are fabricated on sheet metal layer **30** by roll forming. Roll forming is a progressive process in which sheet metal layer **30** is shaped by a series of rolls, each roll slightly changing the shape of the sheet metal. When the sheet metal reaches the end of the line, the desired shape is achieved. Roll forming produces high quality products quickly and inexpensively compared to traditional press operations and is desirable for producing long shapes.

The roll forming of sheet metal layer **30** produces tongue portion **58** having a tongue surface **66** spanning a width **68** of sheet metal layer **30** and a first rear support section **70** contiguous with tongue surface **66**. Likewise, the roll forming of sheet metal layer **30** produces groove portion **62** having a groove surface **72** that spans width **68** of sheet metal layer **30** and a second rear support section **74** contiguous with groove surface **72**. As such, a cavity **76** is formed in second door section **24**.

Insulating foam board **50** is positioned in cavity **76** and first side **52** is bonded to inner surface **48** of sheet metal layer **30** using an adhesive **78**. In an exemplary embodiment, adhesive **78** is a hot melt polyurethane reactive (PUR) adhesive. Hot melt PUR adhesive is preferred because it may be applied to a substrate as a dot or as a thin glue line, rather than using a slot die or roll coater. In addition, hot melt PUR adhesive sets in seconds and is structurally rigid in minutes following a final set. Although hot melt PUR adhesive is preferred, it should be apparent to those skilled in the art, that other adhesives may be used in place of hot melt PUR adhesive that have these similar properties.

Insulating foam board **50** is formed from polystyrene foam board insulation. A density of polystyrene insulating foam board **50** is approximately two pounds per cubic foot. Accordingly, polystyrene insulating foam board **50** is known as two-pound-density expanded polystyrene (EPS) foam insulation. Insulating foam board **50** of two-pound-density EPS is desirable due to the thermal performance and structural rigidity of two-pound-density EPS. Although two-pound-density EPS is preferred, it should be apparent to those skilled in the art that other insulating materials may be used. For example, other densities of EPS, polyurethane, and polyisocyanurate are available as rigid foam boards having effective thermal performance.

In a preferred embodiment, steel laminate backing **56** is twenty-six gauge steel laminated, or bonded, to second side **54** of insulating foam board **50**. Insulating foam board **50** having twenty-six gauge steel laminate backing **56** is desirable for producing second door section **24** having effective thermal performance and structural rigidity. Although twenty-six gauge steel is preferred for steel laminate backing **56**, it should be apparent to those skilled in the art that other widths of steel may be utilized. Alternatively, other metals, such as aluminum, formed into sheets may be utilized.

First and second rear support sections **70** and **74**, respectively, are configured to abut steel laminate backing **56** when insulating foam board **50** is installed into cavity **76**. In particular, first rear support section **70** includes a first segment **80** oriented substantially perpendicular to and contiguous with tongue surface **66**. First segment **80** extends toward second longitudinal edge **64**. A second segment **82**, contiguous with first segment **80**, is formed through the roll forming process and extends toward inner surface **48** of sheet metal layer **30**. A third segment **84**, contiguous with second segment **82**, is formed through the roll forming process and extends toward first longitudinal edge **60**. Third segment **84** has a first planar side **86** that abuts steel laminate backing **56** of insulating foam board **50**.

Second rear support section **74** is similar to first rear support section **70**. In particular, second rear support section **74** includes a first segment **88** oriented substantially perpendicular to and contiguous with groove surface **72**. First segment **88** extends toward first longitudinal edge **60**. A second segment **90**, contiguous with first segment **88** extends toward inner surface **48** of sheet metal layer **30**, and a third segment **92**, contiguous with second segment **90** extends toward second longitudinal edge **64**. Third segment **92** has a second planar side **94** that abuts steel laminate backing **56** of insulating foam board **50**. First and second rear support sections **70** and **74**, respectively, function to further retain insulating foam core **50** and to provide rigidity and strength to second door section **24**.

In a preferred embodiment cellular foam trim boards **32** are formed from cellular polyvinylchloride (PVC) and include a wood grain finish side **96** for replicating an appearance of wood. Cellular PVC (also called PVC foam or expanded PVC) is a form of polyvinylchloride that has been extruded with a foaming agent. Cellular PVC trim boards **32** are resistant to degradation from the weather, durable, and cost effective. Although cellular PVC trim boards **32** are white, they may be readily painted by first wiping boards **32** with alcohol. Generally, cellular PVC trim boards **32** machine similarly to wood, and can be mitered.

Referring to FIG. **3** in connection with FIG. **2**, FIG. **3** shows a sectional view of cellular foam trim board **32** along line **3-3** in FIG. **2**. Cellular PVC trim board **32** has a bonding side **98** configured to be coupled to outer surface **48** of sheet metal layer **30**. Bonding side **98** includes spaced-apart channels **100** arranged lengthwise along cellular foam trim board **32**. Channels **100** are formed in cellular PVC trim board **32** during the extruding process and serve as glue joints on bonding side **98**.

Cellular PVC trim boards **32** are readily bonded to outer surface **46** of sheet metal layer **30** using an adhesive **102**. Adhesive **102** may be conventional PVC cement. Alternatively, cellular PVC trim boards **32** may be bonded to outer surface **46** using SB-190 Everseal, manufactured by Surebond, Inc., Schaumberg, Ill. SB-190 Everseal provides effective tensile and impact strength, and securely adheres to most rigid materials.

Cellular PVC trim boards **32** are further secured to sheet metal layer **30** by stapling boards **32** to outer surface **46** using brad nails **104**. Brad nails **104** advantageously curl up under sheet metal layer **30** after they have penetrated layer **30** to provide additional adherence of trim boards **32** to sheet metal layer **30** and to provide additional resistance to shear stress.

Although, cellular PVC is preferred for cellular foam trim boards **32**, it should be apparent to those skilled in the art that other engineered materials may be used. Other exemplary engineered materials include polystyrene trim, polyurethane trim, polymer composite resin, and polyethylene lumber.

FIG. **4** shows a rear view of second door section **24** of the carriage house replica garage door **20** (FIG. **1**). As discussed in connection with FIG. **2**, the structure of second door section **24** is described for clarity of illustration. However, the following description of second door section **24** applies to first and third door sections **22** and **26** as well.

Second door section **24** further includes end support members **106** coupled to first and second lateral edges **108** and **110**, respectively, of second door section **24**. In particular, end support members **106** are stapled to first segment **80** of first rear support section **70** along first and second lateral edges **108** and **110**. Likewise, end support members **106** are stapled to first segment **88** of second rear support section **74** along first and second lateral edges **108** and **110**. End support members **106** provide structural rigidity along first and lateral edges **108** and **110**, and provide a mounting surface for guide members **28** (FIG. **1**).

Second door section **24** also includes a center support member **112** coupled to first and second longitudinal edges **60** and **64**, respectively, sheet metal layer **30**. In particular, center support member **112** is stapled to each of first segment **80** of first rear support section **70** and first segment **88** of second rear support section **74**. Center support members **112** provide structural rigidity along width **42**. In particular, center support member **112** functions to prevent second door section **24** from bowing along width **42** between first and second lateral edges **108** and **110**, respectively.

In a preferred embodiment, when width **42** of door **20** (FIG. **1**) is eight feet, second door section **24** includes one center support member **112** located approximately central to width **42**. When width **42** of door **20** is ten to twelve feet, second door section **24** may include two spaced-apart center support members **112**. When width **42** is greater than twelve feet, for example, sixteen or eighteen feet, second door section **24** may include three spaced-apart center support members **112**.

FIG. **5** shows a sectional view of one of end support members **106** along line **5-5** in FIG. **4**. Each of end support members **106** includes a fanfold section **113**, a span section **114** contiguous with fanfold section **113**, and a rear support section **116** contiguous with span section **114**. End support members **106** are shaped by roll forming twenty-four to twenty-six gauge steel.

As shown in FIG. **5**, fanfold section **113** has a first fold **118** configured to mesh with first lateral edge **108** of sheet metal layer **30**. A second fold **120** lies against inner surface **48** of sheet metal layer **30** to provide strength. Span section **114** extends away from inner surface **48** of sheet metal layer **30** to conceal insulating foam board **50**. As shown, insulating foam board **50** is notched to accommodate second fold **120**.

Rear support section **116** includes a first segment **122** oriented substantially perpendicular to span section **114** and extending toward second lateral edge **110**. A second segment **124**, contiguous with first segment **122**, is bent through the roll forming process and extends toward inner surface **48** of sheet metal layer **30**. A third segment **126**, contiguous with second segment **124**, is bent through the roll forming process and extends toward first lateral edge **108**. Third segment **126** has a planar side **128** that abuts steel laminate backing **56** of insulating foam board **50**.

FIG. **6** shows a sectional view of center support member **112** along line **6-6** in FIG. **4**. Center support member **112** includes an inner support section **130**, a span section **132** contiguous with inner support section **130**, and a rear support section **134** contiguous with span section **132**. Center support member **112** is shaped by roll forming twenty-four to twenty-six gauge steel.

As shown in FIG. **6**, inner support section **130** is interposed between inner surface **48** of sheet metal layer **30** and first side **52** of insulated foam board **50**. Span section **132** extends away from inner surface **48** of sheet metal layer **30**. Insulated foam board **50** is split into two portions, referred to herein as first insulated foam board **50'** and second insulated foam board **50"**, so that span section **132** may be located between first and second insulated foam boards **50'** and **50"**, respectively.

Rear support section **134** includes a first segment **136** oriented substantially perpendicular to and contiguous with span section **132**. First segment **136** extends toward first lateral edge **108** (FIG. **4**) of sheet metal layer **30**. A second segment **138**, contiguous with first segment **136**, is bent through the roll forming process to extend away from inner surface **48** of sheet metal layer **30**. A third segment **140**, contiguous with second segment **138**, is bent through the roll forming process to extend toward second lateral edge **110** of sheet metal layer **30**. A fourth segment **142**, contiguous with third segment **140**, is bent through the roll forming process to extend toward inner surface **48** of sheet metal layer **30**. A fifth segment **144**, contiguous with fourth segment **142**, is bent through the roll forming process to extend back toward first lateral edge **108** of sheet metal layer **30**. Each of first and fifth segments **136** and **144**, respectively, have a planar side **146** that abuts steel laminate backing **56** of insulating foam board **50**.

In addition, to preventing bowing of second door section **24** along width **42**, center support member **112** also provides structural rigidity throughout a thickness of door section **24**. This structural rigidity is provided by the cooperative relationship between inner support section **130**, span section **132**, and rear support section **134** and by roll forming center support member **112** from one piece of steel.

FIG. **7** shows a partial side view of one of section joints **40** between two door sections of the carriage house replica garage door **20** (FIG. **1**). For example, section joint **40** is formed between first door section **22** and second door section **24**. As shown, tongue portion **58** of second door section **24** mates with groove portion **62** of first door section **22**. Although not shown, groove portion **62** of second door section **24** mates with tongue portion **58** of third door section **26** in the same manner. Cellular foam trim boards **32** are installed on the outer face of first and second door sections **22** and **24**, respectively.

FIG. **7** also shows foam insulating layer **50** with steel laminate backing **56** positioned in cavity **76**. Second planar side **94** of second rear support section **74** abuts steel laminate backing **56** located in first door section **22**. Likewise, first planar side **86** of first rear support section **70** abuts steel laminate backing **56** located in second door section **24**. Dashed lines **148** represent the relationship between the location of end support members **106** (FIG. **4**) and center support members **112** (FIG. **4**) relative to first rear support section **70** of sheet metal layer **30** of second door section **24**. Similarly, dashed lines **148** represent the relationship between the location of end support members **106** and center support members **112** relative to second rear support section **74** of sheet metal layer **30** of first door section **22**.

FIG. **8** shows a front view of door section **24** of carriage house replica door **20** (FIG. **1**) including a trim board system **150** in accordance with an alternative embodiment of the present invention. Temperature extremes, direct sunlight, and color can have an undesirable impact on the ability of a material to be used as a trim board for carriage house replica door **20**. For example, steel doors painted a dark color can reach temperatures in excess of two hundred degrees when the door is in direct sunlight and when the air temperature exceeds one hundred degrees. Under these extreme conditions, some materials may have expansion and contraction problems, such as buckling, cupping, splitting, bowing, and so forth, that render the materials unusable.

Accordingly, it will become apparent in the ensuing discussion that trim board system **150** can be advantageously utilized on the twenty-eight inch door sections **22**, **24**, and **26** (FIG. **1**) of carriage house replica door **20** in lieu of, or as an adjunct to cellular foam trim boards **32** (FIG. **1**) in locations subject to temperature extremes, direct sunlight, and/or when carriage house replica door is to be a dark color. In addition, although trim board system **150** is described in connection with carriage house replica door **20**, described in detail above, trim board system **150** may be alternatively utilized in connection with steel or aluminum garage doors having an opened faced structure, other sandwich-style structures and more or less than the three twenty-eight inch door sections, described above.

Referring to FIGS. **9-11**, FIG. **9** shows a perspective view of a first channel section **152** of trim board system **150**. FIG. **10** shows a perspective view of a second channel section **154** of trim board system **150**, and FIG. **11** shows a partial sectional view of door section **24** along line **11-11** of FIG. **8**. Trim board system **150** includes first channel section **152** and second channel section **154** interlocking with first channel section **152**. In a preferred embodiment first and second channel sections **152** and **154**, respectively, are manufactured from steel sheet metal that is formed into channel sections **152** and **154** by rollforming or bending the steel sheet metal.

First channel section **152** includes a first surface portion **158** having a first side **160** and a second side **162**. First side **160** is configured for attachment to sheet metal layer **30** of door section **24**. In a preferred embodiment, first channel section **152** is coupled to sheet metal layer **30** utilizing a combination of structural adhesive and mechanical fasteners, such as rivets, screws, staples, and the like.

First surface portion **158** includes first and second substantially parallel longitudinal edges **164** and **166**, respectively. A first lip **168** is formed along first edge **164** of first surface portion **158**. Similarly, a second lip **170** is formed along second edge **166** of first surface portion **158**. First and second lips **168** and **170**, respectively, extend from second side **162** of first surface portion **158**. Each of first and second lips **168** and **170**, respectively, of first channel section **152** includes an outwardly flanged longitudinal edge **172**, the purpose of which will be discussed below.

Brace means, in the form of a longitudinally extending rib **174**, is juxtaposed between first and second channel sections **152** and **154**, respectively. In an exemplary embodiment, rib **174** projects from first surface portion **158**, and is formed by rollforming or bending the sheet metal of first channel section **152**. Alternatively, rib **174** may be a separate component that is coupled by structural adhesive and/or mechanical fasteners to either of first or second channel sections **152** and **154**.

Second channel section **154** includes a second surface portion **180** having a third side **182** and a fourth side **184**. Second surface portion **180** is rotary embossed with a wood grain pattern for replicating an appearance of wood. Second surface portion **180** includes third and fourth substantially parallel longitudinal edges **186** and **188**, respectively. A third lip **190** is formed along third edge **186** of second surface portion **180**. Similarly, a fourth lip **192** is formed along fourth edge **188** of second surface portion **180**. Third and fourth lips **190** and **192**, respectively, extend from third side **182** of second surface portion **180**. In addition, each of third and fourth lips **190** and **192** of second channel section **154** includes a folded longitudinal extension portion **194** formed by bending the outer edge of each of third and fourth lips **190** and **192** inwardly.

Second channel section **154** further includes a first closed end **202** and a second closed end **204** at opposing ends of second surface portion **180**. During manufacturing, second channel section **154** is notched to form tabs **206**, of which only two can be seen. Second surface portion **180** is then folded to create folded ends **208**, and tabs **206** are overlapped onto folded ends **208** of second surface portion **180**. Tabs **206** are then secured onto folded ends **208** by spot-welding, gluing, riveting, and so forth to form a solid structure. First and second closed ends **202** and **204** may be further sealed at each inside corner with a caulk or siliconized sealant to prevent the entry of moisture.

To assemble, first side **160** of first surface portion **158** of first channel section **152** is coupled to sheet metal **30** of door section **24**. Second channel section **154** is then mated, or engaged, with first channel section **152**. In a preferred embodiment, inner sides **210** of third and fourth lips **190** and **192**, respectively, engage with corresponding outer sides **212** of first and second lips **168** and **170**, respectively. More specifically, when second channel section **154** is compressed onto first channel section **152**, folded extension portions **194** interlock with corresponding flanged edges **172** to retain second channel section **154** onto first channel section **152** without the need for additional structural adhesive and/or mechanical fasteners. The interconnection of folded longitudinal extension portions **164** with flanged edges **172** forms a secure locking mechanism and enhances the structural integrity of trim board system **150**.

In addition, the two-piece snap together design allows for damaged components to be readily replaced. The two-piece snap together design also enables any fasteners to be concealed, and reduces the overall weight of trim board system **150** over prior art natural and man-made trim boards. Longitudinally extending rib **174** is lightweight, and provides bracing between first and second channel sections **152** and **154** to help resist the denting or crushing that might occur due to compressive force. Yet another advantage of trim board system **150** is that it is cost effective to manufacture. More specifically, trim board system **150** is a design that is readily placed in a production line environment with robotics and self-piercing rivets, thus making production time faster than current production times.

FIG. **12** shows a partial sectional view of door section **24** in which a trim board system **213** in accordance with an alternative embodiment of the present invention is employed. Trim board system **213** is similar to trim board system **150** in that it includes a first channel section **214** and a second channel section **216**. An optional insulating foam board **218** is juxtaposed between first and second channel sections **214** and **216**, respectively. Insulating foam board **218** may be expanded polystyrene foam (EPS) with a density of 0.7 or greater, and may be bonded to either of first and second channel sections **214** and **216**.

First channel section **214** includes first lips **220**, each having a first longitudinally extending rib **222** projecting from a first inner side **224** of each of first lips **220**. Similarly, second channel section **216** includes second lips **226**, each having a second longitudinally extending rib **228** projecting from a second inner side **230** of each of second lips **226**.

To assemble, first channel section **214** is coupled to sheet metal **30** of door section **24**, as discussed in connection with first channel section **152** (FIG. **11**). Insulating foam board **218** is then positioned within first channel section **214**. Insulating foam board **214** may optionally be adhered to first channel section **214** using a structural adhesive. Second channel section **216** is then mated, or engaged, with first channel section **214**, such that second lips **226** of second channel section **216** cover first lips **220** of first channel section **214**. In addition, second ribs **228**, projecting from second lips **226**, engage first ribs **222**, projecting from first lips **220**. Thus, first ribs **222** and **228** effectively interlock to retain second channel section **216** onto first channel section **214** without the need for additional structural adhesive and/or mechanical fasteners. Accordingly, a strong steel trim board is formed that replicates the appearance of wood but is but is impervious to the problems encountered with temperature extremes, direct sunlight, and dark colors. Insulating foam board, juxtaposed between first and second channel sections **214** and **216**, is lightweight, while at the same time, fills the cavity between first and second channel sections **214** and **216**, respectively, to help reduce the denting or crushing that might occur due to compressive force.

FIG. **13** shows a front view of door section **24** of carriage house replica door **20** (FIG. **1**) including a trim board assembly **232** in accordance with another alternative embodiment of the present invention. Like the situation discussed in connection with FIG. **8**, temperature extremes, direct sunlight, and color can have an undesirable impact on the ability of a material to be used as a trim board for carriage house replica door **20**.

Like trim board system **150** (FIG. **8**), it will become apparent in the ensuing discussion that trim board assembly **232** can be advantageously utilized on the twenty-eight inch door sections **22**, **24**, and **26** (FIG. **1**) of carriage house replica door **20** in lieu of, or as an adjunct to cellular foam trim boards **32** (FIG. **1**) in locations subject to extreme environmental conditions. However, trim board assembly **232** is of a simpler construct than trim board system **150** which lessens the cost of manufacturing.

Although trim board assembly **232** is described in connection with carriage house replica door **20**, discussed in detail above, trim board assembly **232** may be alternatively utilized in connection with steel or aluminum garage doors having an opened faced structure, other sandwich-style structures and more or less than the three twenty-eight inch door sections, described above.

Referring to FIGS. **14-15**, FIG. **14** shows an exploded perspective view of trim board assembly **232**, and FIG. **15** shows a partial sectional view of door section **24** along section line **15-15** of FIG. **13**. Trim board assembly **232** includes a backing **234** and a channel section **236** installed over backing **234**. Brace means, in the form of an insulating foam board **238**, is juxtaposed between backing **234** and channel section **236**. In a preferred embodiment, backing **234** and channel section **236** are manufactured from steel sheet metal. As shown, backing **234** is substantially flat. In contrast, channel section **236** may be manufactured in its desired shape by rollforming or bending the steel sheet metal.

Backing **234** includes a first side **242** and a second side **244**. First side **242** is configured for attachment to a face **246** of sheet metal layer **30** of door section **24** (FIG. **13**). In a preferred embodiment backing **234** is coupled to sheet metal layer **30** utilizing a combination of structural adhesive **248**, such as an epoxy-based cement, and mechanical fasteners, such as self-taping sheet metal screws **250**, rivets, staples, and the like.

Channel section **236** includes a surface portion **252** having an interior side **254** and an exterior side **256**. Surface portion **252** may optionally be rotary embossed for replicating an appearance of wood. A first leg **258** is formed along a first longitudinal edge **260** of surface portion **252**. Similarly, a second leg **262** is formed along a second longitudinal edge **264** of surface portion **252**. First and second legs **258** and **262**, respectively, extend from interior side **254** of surface portion **252**. First and second legs **258** and **262**, respectively, may be approximately 0.375 to 0.75 inches in height to create a C-channel type of steel board.

First and second legs **258** and **262**, respectively, include hem edges **265**. Hem edges **265** are created by rollforming the sheet metal edge to fold it directly over itself, leaving a small radius at the fold. Hem edges **265** enhance the strength of channel section **236**, improve the appearance of channel section **236**, and eliminate sharp edges in areas where metal could come into contact with human skin, such as during installation.

Channel section **236** further includes a first closed end **266** and a second closed end **268** at opposing ends of surface portion **252**. During manufacturing, slots may be cut at the opposing ends of surface portion **252**. Surface portion **252** may simply be folded over at the same height as first and second legs **258** and **262**, respectively, to create first and second closed ends **266** and **268**, respectively. Alternatively, channel section **236** may be manufactured to include tabs, such as tabs **206** (FIG. **10**) described in connection with second channel section **154** (FIG. **10**) of trim board system **150** (FIG. **8**). First and second closed ends **266** and **268**, respectively, may also include hem edges, such as hem edges **265** discussed above.

Together, first and second legs **258** and **262** and first and second closed ends **266** and **268** define the perimeter of an

interior cavity **270** of channel section **236** into which insulating foam board **238** is positioned.

Insulating foam board **238** is of a length and a width that enables foam board **238** to reside in interior cavity **270**. Similarly, a thickness of insulating foam board **238** is approximately equivalent to the depth of interior cavity **270** so that channel section **236** is largely filled when foam board **238** is installed in interior cavity **270**.

In an exemplary embodiment, foam board **238** is expanded polystyrene (EPS) foam. EPS foam is lightweight, yet structurally strong, exhibits high thermal efficiency and insulation properties, and is resistant to moisture. Accordingly, trim board assembly **232** including foam board **238** of EPS foam is lightweight, resistant to crushing, and cost effective to manufacture.

Those skilled in the art will recognize that alternative materials may be utilized for insulating foam board **238** rather than EPS foam. In addition, a trim board assembly need not include a foam board, but may instead include a metal, longitudinally disposed, rib member juxtaposed between backing **234** and channel section **236** in place of foam **238** to serve as brace means.

Backing **234** exhibits a length **272** and a width **274**. Similarly, channel section **236** exhibits a length **276** and a width **278**. In an exemplary embodiment, length **272** of backing **234** may be less than length **276** of channel section **236**. Likewise, width **274** of backing **234** may be less than width **278** of channel section **236**. As will be discussed below, once constructed, this difference between lengths and widths enables the construction of trim board assembly **232** such that physical contact between backing **234** and channel section **236** is inhibited or prevented at an attachment location of backing **234** and channel section **236**.

Inhibiting or preventing metal to metal contact between backing **234** and channel section **236** is particularly desirable when backing **234** and channel section **236** are fabricated from dissimilar metals. Preventing contact between dissimilar metals prevents galvanic corrosion which will eventually cause the metals to disintegrate. Even when the metals are of the same or compatible materials, preventing contact between the metals can be advantageous in that one layer of metal cannot rub or wear against the other. Should the two metal surfaces rub against each other enough to scratch off their protective coating, such as paint, bare metal can become exposed to the corrosive effects of the environment. Furthermore, by maintaining space between backing **234** and channel section **236**, a better moisture resistant seal can be made with caulk (discussed below) so as to limit the deleterious effects of crevice corrosion in which dirt accumulates in the joints and seams of metal fixtures, and moisture collects in this accumulated dirt.

Manufacture of trim board assembly **232** entails coating both sides of insulating foam board **238** with a hot melt adhesive **280**. Foam board **238** is inserted into cavity **270** and second side **244** (i.e., the inner side) of backing **234** is then applied to foam board **238**. Trim board assembly **232** is then put through a laminator that provides heat sufficient to soften adhesive **280** so that channel section **236** and backing **234** adhere to foam board **238**. Accordingly, adhesive **280** and foam board **238** function as means for attaching channel section **236** to backing **234** while inhibiting or preventing physical contact between backing **234** and channel section **236** at the attachment location (i.e., the areas of adhesion utilizing adhesive **280**).

In a preferred embodiment, adhesive **280** is a hot melt polyurethane adhesive. Hot melt adhesives are typically solvent-free thermoplastics that melt or drop in viscosity above 180° F., and then rapidly set upon cooling. Conventional hot melt adhesives can be repeatedly softened by heat and hardened or set by cooling, which allows parts to be removed, repositioned, or replaced during assembly. In contrast, polyurethane (PUR) reactives or hot melt polyurethane adhesives are applied like conventional hot melt adhesives, but the PUR adhesives reacts with moisture to form crosslinked bonds that cannot be remelted. Accordingly, PUR reactives or hot melt polyurethane adhesives provide excellent flexibility, impact resistance, heat resistance, and durability. Although hot melt polyurethane adhesive is preferred herein for adhesive **280**, it should be understood that alternative hot melt, two-part catalyst, or thermoset adhesives may be utilized to adhere insulating foam board **238** with backing **234** and channel section **236**.

After trim board assembly **232** is manufactured, each trim board assembly **232** is mechanically fastened to face **246** of sheet metal layer **30** of any of door sections **22**, **24**, and **26** (FIG. **1**) that make up carriage house replica garage door **20** (FIG. **1**), using sheet metal screws **250**, and bonded, using structural adhesive **248**. Once coupled, caulk **282** is applied at the junction of trim board assembly **232** with sheet metal layer **30** to prevent moisture from penetrating the underside of trim board assembly **232**. Thus, various patterns for carriage house replica door can be created using a number of trim board assemblies **232**.

The design of trim board assembly **232** yields a sandwich structure steel board that is lightweight, moisture resistant, durable, and not compromised under harsh environmental conditions. The inclusion of insulating foam board **238** also enables trim board assembly **232** to resist the denting or crushing that might occur due to compressive force. In addition, trim board assembly **232** is cost effective to manufacture. That is, it can be readily placed in a production line environment thus making production time faster than current production times.

Referring now to FIGS. **16-17**, FIG. **16** shows an exploded perspective view of a trim board assembly **284** in accordance with another alternative embodiment of the present invention, and FIG. **17** shows a partial sectional view of the trim board assembly **284** in an assembled form along line **17-17** of FIG. **16**. Trim board assembly **284** includes channel section **236** and insulating foam board **238**. Accordingly, the description of channel section **236** and insulating foam board **238** need not be repeated in connection with trim board assembly **284**.

However, trim board assembly **284** includes a support backing **286** as a replacement for backing **234** (FIG. **14**) of trim board assembly **232** (FIG. **14**). Support backing **286** includes a backing surface **288** having a first side **290** and a second side **292**, with first side **290** being configured for attachment to face **246** (FIG. **15**) of sheet metal layer **30** (FIG. **15**) of, for example, door section **24** (FIG. **15**).

A first support **294** is formed along a first edge **296** at an end of backing surface **288**, and extends from second side **292** of backing surface **288**. Similarly, a second support **298** is formed along a second edge **300** at an opposing end of backing surface **288**, and extends from second side **292** of backing surface **288**. Thus, first and second supports **294** and **298**, respectively, are positioned across a width **302** of backing surface **288**.

Like trim board assembly **232**, a length **304** and width **302** of support backing **288** is less than length **276** (FIG. **14**) and width **278** (FIG. **14**) of channel section **236**. Accordingly, when trim board assembly **284** is constructed, first and second supports **294** and **298**, respectively, of support backing **286** reside in cavity **270** of channel section **236**. Thus,

first and second supports **294** and **298** provide additional rigidity to trim board assembly **284** and help to guide support backing **288** properly into place over insulating foam board **238** during assembly.

Since length **304** of support backing **288** is less than length **276** of channel section **236**, a gap **306** is formed between each of first and second supports **294** and **298**, respectively, and corresponding interior walls **308** of channel section **236**. In a preferred embodiment, a caulk bead **310** may fill gap **306** to maintain separation between support backing **288** and channel section **236**. In addition, since caulk bead **310** is applied between the metal surfaces of channel section **236** and support backing **288**, a more effective moisture resistant seal is obtained. Of course, it should be apparent to those skilled in the art that the longitudinal edges of support backing **288** may also include supports resembling first and second supports **294** and **298** to further increase the stiffness and moisture sealing properties of trim board assembly **284**.

In summary, the present invention teaches of a door section for a carriage house replica garage door. The carriage house replica garage door, fabricated from three door sections and trimmed with sandwich-structure steel trim board assemblies, form an aesthetically pleasing and cost effective replica of a wood sectional carriage house garage door. Furthermore, the sheet metal trim board assemblies are lightweight, durable, impervious to the problems encountered with temperature extremes, direct sunlight, and dark colors, and are not subject to insect damage. The trim board assemblies are moisture resistant, subject to little or no rusting, and are resistant to crushing and denting. As such, the carriage house replica garage door, having a design created through the use of steel trim board assemblies, requires little maintenance.

Although the preferred embodiments of the invention have been illustrated and described in detail, it will be readily apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims. For example, the door sections may be adapted for use in a four section carriage house replica garage door, rather than the three section carriage house garage door described herein.

What is claimed is:

1. A trim board assembly for a door section of a carriage house replica garage door comprising:

a garage door section having an outer face; and

a trim board assembly, comprising:

a backing attached to said face of said door section;

a channel section installed over said backing;

brace means juxtaposed between said backing and said channel section; and

means for attaching said channel section to said backing that inhibits physical contact between said backing and said channel section at an attachment location, wherein said attaching means is an adhesive for adhering said brace means to each of an interior surface of said channel section and an inner side of said backing.

2. A trim board assembly as claimed in claim **1** wherein said backing is substantially flat steel.

3. A trim board assembly as claimed in claim **1** wherein said backing comprises:

a backing surface having a first side and a second side, said first side configured for attachment to said face of said door section;

a first support formed along a first edge of said backing surface; and

a second support formed along a second edge of said backing surface, said first and second supports extending from said second side of said backing surface.

4. A trim board assembly as claimed in claim **3** wherein said first and second supports are positioned across a width of said backing surface.

5. A trim board assembly as claimed in claim **3** wherein said channel section includes an interior cavity and said first and second supports of said backing reside in said interior cavity.

6. A trim board assembly as claimed in claim **5** wherein a dimension of said backing is less than a corresponding dimension of said channel section to form a gap between each of said first and second supports and corresponding interior walls of said channel section.

7. A trim board assembly as claimed in claim **6** further comprising a caulk bead filling said gap to maintain separation between said backing and said channel section.

8. A trim board assembly as claimed in claim **1** wherein said channel section comprises:

a surface portion having an interior side and an exterior side;

a first leg formed along a first longitudinal edge of said surface portion; and

a second leg formed along a second longitudinal edge of said surface portion, said first and second legs extending from said interior side of said surface portion.

9. A trim board assembly as claimed in claim **8** wherein each of said first and second legs of said channel section comprises a hem edge.

10. A trim board assembly as claimed in claim **1** wherein said brace means comprises an insulting foam board.

11. A trim board assembly as claimed in claim **1** wherein said attaching means prevents physical contact between said backing and said channel section at an attachment location.

12. A trim board assembly as claimed in claim **1** wherein each of said backing and said channel section is formed from sheet metal.

13. A door section for a carriage house replica garage door comprising

a sheet metal layer having an outer face;

a trim board assembly including:

a backing attached to said face of said door section;

a channel section installed over said backing, each of said backing and said channel section being formed from sheet metal;

brace means juxtaposed between said backing and said channel section; and

means for attaching said channel section to said backing that inhibits physical contact between said backing and said channel section at an attachment location, wherein said attaching means is an adhesive for adhering said brace means to each of an interior surface of said channel section and an inner side of said backing.

14. A door section as claimed in claim **13** wherein said backing of said trim board assembly comprises:

a backing surface having a first side and a second side, said first side configured for attachment to said face of said door section;

a first support formed along a first edge of said backing surface; and

a second support formed along a second edge of said backing surface, said first and second supports extending from said second side of said backing surface, and said first and second support residing in an interior cavity of said channel section.

15. A door section as claimed in claim 13 wherein said brace means comprises an insulating foam board.

16. A trim board assembly for a door section of a carriage house replica garage door comprising:

a door section having an outer face;

a trim board assembly including:

a backing attached to said face of said door section;

a channel section installed over said backing, said channel section including a surface portion having an interior side and an exterior side, a first leg formed along a first longitudinal edge of said surface portion, and a second leg formed along a second longitudinal edge of said surface portion, said first and second legs extending from said interior side of said surface portion;

brace means juxtaposed between said backing and said channel section; and

adhesive adhering said brace means to each of an interior surface of said channel section and an inner side of said backing that inhibits physical contact between said backing and said channel section at an attachment location.

17. A trim board assembly as claimed in claim 16 wherein said brace means comprises an insulating foam board.

18. A trim board assembly for a door section of a garage door comprising:

a door section having an outer face;

a trim board assembly including:

a backing attached to said face of said door section, wherein said backing has a first longitudinal edge and a second longitudinal edge;

a channel section installed over said backing, wherein said channel section includes a first leg adjacent to said first longitudinal edge and a second leg adjacent to said second longitudinal edge, wherein said first and second legs are substantially flat, and wherein a dimension of said backing is less than a corresponding dimension of said channel section to form a gap between each of said first and second longitudinal edges and corresponding said first and second legs of said channel section; and

means for attaching said channel section to said backing that inhibits physical contact between said first and second longitudinal edges of said backing and corresponding said first and second legs of said channel section, wherein said attaching means is an adhesive.

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